National Institute of Environmental Health Sciences

Sustainability of pasture-based livestock farming systems in the European Mediterranean context: Synergies and trade-offs

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Abstract:

The sustainability of livestock farming systems (LFS) in relation to global concerns about climate change, population dynamics and the quality of the agro-ecosystem services that are provided to society and their trade-offs has become a fundamental issue for public and scientific debate. However, LFS differ widely in terms of the use of resources, degree of intensification, species and orientation of production, local/regional socio-economic and market context, cultural roles, etc. Therefore, we need to disaggregate livestock farming systems when analysing any aspect of sustainability. This paper discusses low-input pasture-based farming systems (meat sheep and beef cattle) located in mountainous and other less favoured areas of the European Mediterranean basin. We first describe their recent evolution in terms of the level of intensification and structural, economic, social and environmental factors at the farm level, paying special attention to critical points of sustainability. Despite the diversity encountered, there are some common factors that threaten their future, such as an excessive dependency on premiums, the lack of generational turnover due to a number of increasingly influential social factors and a continuous process of abandonment of large marginal areas and concentration in more favourable areas. Next, we depict some relevant synergies and trade-offs between a number of factors that we have previously described, taking into account the wider socio-economic environment in which farms operate. Pasture-based LFS can satisfy societal demands (for public goods such as landscape and biodiversity or ethical concerns about food production) and are less vulnerable to market changes. However, they are not paid for the environmental services they deliver, they suffer displacement by other economic activities, and they are very sensitive to climate change scenarios. We also point out a number of options for designing and implementing more sustainable pasture-based LFS under very uncertain circumstances; the concepts of resilience, adaptive capacity and self-sufficiency are discussed within this context. Finally, we summarise some areas for future research: -valuation and integration of positive externalities of pasture-based LFS in an analytical sustainability frameworks and management tools, -assessment of the diversity of systems, the impact they generate and the public goods they deliver, -analysis of complex relationships between intensification of production, dependence on off-farm/on-farm inputs, productivity and working conditions, -consideration of the social factors that determine continuity and working conditions, -and the necessity of performing dynamic studies that allow the understanding and anticipation of change.

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Resource Description

Communication:

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience:

audience to whom the resource is directed

Policymaker

Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Security

Food/Water Security: Livestock Productivity

Geographic Feature:

resource focuses on specific type of geography

Mountain

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Region

Other European Region: European Mediterranean basin

Health Impact:

specification of health effect or disease related to climate change exposure

General Health Impact

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern:

populations at particular risk or vulnerability to climate change impacts

Low Socioeconomic Status

Resource Type:

format or standard characteristic of resource

Research Article

Timescale: ☒

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☒

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content